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PLANETARY PHENOMENA FOR JANUARY AND FEBRUARY, 1899.

By Professor Malcolm McNeill.

January.

Eclipse. There will be a partial eclipse of the Sun on January 11th, visible in the northwestern portion of North America and in northeastern Asia. It will begin just before sunset in the States north of California, and will not be seen at all in other portions of the United States.

Mercury is a morning star throughout the month, and may be seen just before sunrise on any clear morning. It is at its greatest western elongation on January 11th, when it rises about an hour and three quarters before the Sun.

Venus is also a morning star, and rises about three hours before sunrise throughout the month. It is at its greatest brilliancy early in January, and may then be easily seen in full sunlight. It moves 23° eastward and 3° southward during the month, along the borders of the constellations *Ophiuchus* and *Scorpio*, and on January 25th passes about 3° north of *Saturn.*

Mars is in fine position for observation, being above the horizon practically the entire night. It is in opposition to the Sun on January 18th. Its motion is retrograde (westward) about 12°, and also 3° northward during the month among the stars of the constellation *Gemini.* It makes its nearest approach to the Earth on January 15th, when it is a little more than 60,000,000 miles distant from us. This is nearly the maximum opposition distance; and the planet, although the most conspicuous object in that portion of the sky, will be only about one third as bright as it is at an opposition in August, when its distance is only 35,500,000 miles.

Jupiter is a morning star, rising a little after midnight at the end of the month. It moves about 3° eastward and 1° southward during January in the constellation *Libra.*

Saturn is also a morning star, but does not rise until about an hour and a half before sunrise on January 1st. It moves about 3° eastward during the month, somewhat north of the stars forming the tail of the Scorpion.

Uranus is also a morning star, rising about an hour earlier than *Saturn*, but it does not attain an altitude great enough for easy visibility before sunrise.

Neptune is in the eastern part of *Taurus*, too faint to be seen without a telescope.

FEBRUARY.

Mercury is a morning star until February 27th. It then passes superior conjunction with the Sun and becomes an evening star, but throughout the month, except possibly during the first week, it is too near the Sun to be seen.

Venus is still a morning star, and rises about three hours before the Sun, except during the last third of the month, when the interval is somewhat shortened. It reaches its greatest western elongation on February 10th. It moves about 31° eastward through the constellation *Sagittarius*.

Mars is above the horizon nearly the whole night, not setting until nearly sunrise. It moves westward (retrogrades) until February 27th about 5°, somewhat south of *Castor and Pollux*, the principal stars of the constellation *Gemini*. After February 27th it begins to move eastward. Its distance from the Earth changes from 64,000,000 miles, on February 1st, to 80,000,000 miles, on March 1st, and its brightness diminishes about thirty per cent. during the month.

Jupiter rises earlier, before 11 P.M., at the close of the month. It is nearly stationary in the extreme western part of the constellation *Libra*, moving less than 1° eastward until February 24th, and then moving slightly westward during the remainder of the month.

Saturn is a morning star, rising a little after 2 A.M. at the end of the month. It is on the border of the constellations *Scorpio* and *Sagittarius*, and moves about 2° eastward.

Uranus rises about an hour before *Saturn*. It is about 5° north of *Antares*, the principal star of the constellation *Scorpio*.

Neptune is in the eastern part of *Taurus*.

PHASES OF THE MOON, P. S. T.

		H. M.		H. M.
Last Quarter,	Jan. 4,	7 21 P. M.	Feb. 3,	9 24 A. M.
New Moon,	Jan. 11,	2 50 P. M.	Feb. 10,	1 32 A. M.
First Quarter,	Jan. 18,	8 36 A. M.	Feb. 17,	12 52 A. M.
Full Moon,	Jan. 26,	11 34 A. M.	Feb. 25,	6 16 A. M.

THE SUN.

1898.	R. A. H. M.	Declination. ° ′	Rises. H. M.	Transits. H. M.	Sets. H. M.
Jan. 1.	18 47	— 23° 0′	7 27 A.M.	12 4 P.M.	4 41 P.M.
11.	19 31	— 21 48	7 26	12 8	4 50
21.	20 14	— 19 53	7 23	12 12	5 1
Feb. 1.	21 0	— 17 4	7 13	12 14	5 15
11.	21 40	— 14 0	7 2	12 14	5 26
21.	22 19	— 10 31	6 50	12 14	5 38
Mar. 1.	22 49	— 7 33	6 39	12 13	5 47

MERCURY.

Jan. 1.	17 24	— 20 13	5 52 A.M.	10 40 A.M.	3 38 P.M.
11.	17 49	— 21 48	5 44	10 26	3 6
21.	18 41	— 23 0	6 1	10 38	3 16
Feb. 1.	19 48	— 22 20	6 22	11 2	3 42
11.	20 54	— 19 27	6 38	11 29	4 20
21.	22 2	— 14 16	6 49	12 0 M.	5 11
Mar. 1.	22 58	— 8 27	6 50	12 21 P.M.	5 52

VENUS.

Jan. 1.	16 11	— 16 35	4 25 A.M.	9 27 A.M.	2 29 P.M.
11.	16 33	— 17 9	4 9	9 10	2 11
21.	17 3	— 18 13	4 4	9 0	1 56
Feb. 1.	17 43	— 19 21	4 5	8 57	1 49
11.	18 25	— 19 57	4 10	8 59	1 48
21.	19 2	— 19 52	4 6	9 5	1 54
Mar. 1.	19 46	— 19 14	4 17	9 9	2 1

MARS.

Jan. 1.	8 34	+ 22 48	6 31 P.M.	1 53 A.M.	9 15 A.M.
11.	8 20	+ 23 55	5 31	12 59	8 17
21.	8 3	+ 24 55	4 26	11 58 P.M.	7 30
Feb. 1.	7 46	+ 25 39	3 22	10 57	6 32
11.	7 34	+ 25 54	2 29	10 6	5 43
21.	7 27	+ 25 51	1 45	9 21	4 57
Mar. 1.	7 27	+ 25 37	1 14	8 49	4 24

JUPITER.

Jan. 1.	14 17	— 12 26	2 16 A.M.	7 33 A.M.	12 50 P.M.
Feb. 1.	14 30	— 13 26	12 27	5 45	10 59 A.M.
Mar. 1.	14 33	— 13 35	10 45 P.M.	3 58	9 11

SATURN.

Jan. 1.	17 7	— 21 30	5 41 A.M.	10 24 A.M.	3 7 P.M.
Feb. 1.	17 21	— 21 45	3 52	8 35	1 18
Mar. 1.	17 29	— 21 50	2 11	6 54	11 37

Uranus.

Jan. 1.	16 17	− 21 13	4 48 A.M.	9 32 A.M.	2 16 P.M.
Feb. 1.	16 22	− 21 26	2 54	7 37	12 20
Mar. 1.	16 25	− 21 32	1 7	5 50	10 33 A.M.

Neptune

Jan. 1.	5 29	+ 21 55	3 25 P.M.	10 44 P.M.	6 3 A.M.
Feb. 1.	5 26	+ 21 54	1 20	8 39	3 58
Mar. 1.	5 25	+ 21 54	11 29 A.M.	6 48	2 7

ECLIPSES OF *JUPITER'S* SATELLITES, P. S. T.

(Off left-hand limb as seen in an inverting telescope.)

			H.	M.					H.	M.	
II, D,	Jan.	3.	11	33	P.M.	I, D,	Feb.	4.	11	5	P.M.
I, D,		8.	2	36	A.M.	I, R,		5.	1	21	A.M.
II, D,		11.	2	6	A.M.	III, R,		5.	12	46	A.M.
II, R,		11.	4	23	A.M.	I, D,		7.	4	47	A.M.
I, D,		15.	4	29	A.M.	I, D,		8.	11	5	P.M.
II, D,		18.	4	40	A.M.	II, D,		12,	1	39	A.M.
I, D,		24.	12	51	A.M.	II, R,		12,	3	55	A.M.
II, R,		28.	10	47	P.M.	III, D,		13.	1	0	A.M.
I, D,		31.	2	44	A.M.	III, R,		13.	2	43	A.M.
						I, D,		16.	12	58	A.M.
						I, D,		23.	2	51	A.M.
						I, D,		24,	9	20	P.M.